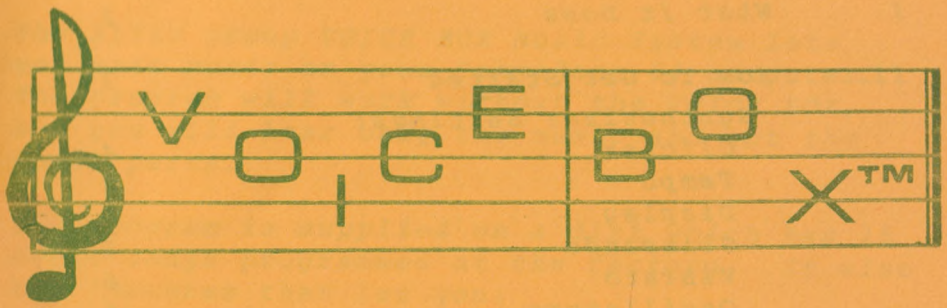


MUSIC SYSTEM

& ANIMATED FACE

for Commodore 64™

*THE **ALIEN** GROUP*
27 West 23rd Street
New York City 10010

© *1983, Matthews Research & Development Corp.*

TABLE OF CONTENTS

SECTION		PAGE
I.	What It Does	2
II.	How To Get Started	3
	Synthesizer Settings:	
	Clicker	4
	Tempo	4
	Display	5
	Glissando	5
	Vibrato	6
	Oscillators	6
	Oscillator Waveforms	6
	Pulse Width Modulation	7
	The Envelope Shaper	7
III.	Recording A Tune	8
IV.	The Filter	9
V.	The Vocal Part:	10
	Editing The Words	10
	Phonetic Spelling	11
VI.	Re-Drawing The Face	12
	Appendix I: Files on Music, 15 Disk	15
	Appendix II: Keys You May Use In Different Parts Of The Program	16
	Appendix III: Phoneme List	19
	Warranty Information	20

VOICE BOX Music System
for Commodore 64

I. WHAT IT DOES

The ALIEN Group VOICE BOX Music System lets you make music on your Commodore 64 computer. The program will work without the VOICE BOX, but you will hear only the music and not the vocal parts.

The program is supplied on a disk which has 15 short songs programmed at the factory. It also has features that let you:

* *Write your own songs, vocal with three-part accompianiment, and record them on the disk.*

* *Play the computer keyboard as a synthesizer.*

* *Write the song lyrics in an easily learned phonetic system.*

* *See your lyrics sung by an animated face.*

* *Re-draw the face with a simple graphics program.*

* *Change and record all synthesizer settings, including such features as a triggered moving filter, variable tempo, vibrato, glissando, pulse width modulation and a metronome track.*

The method of programming the music can easily be used by those who have no musical training.

II. HOW TO GET STARTED

1. Turn off the computer and, if you have an ALIEN Group VOICE BOX, plug it in. Turn the left knob counterclockwise, and the right knob about halfway.

2. Switch on the computer, then put the disk in the drive and type:

```
LOAD"MUSIC",8
```

3. When the computer signals "READY", type"

```
RUN
```

NOTE: If you loaded the program with the DOS WEDGE, you must kill the wedge before running. Do this by typing:

```
@Q
```

You should now be faced with a menu which invites you to type a number. You can usually return to this menu by typing [M].

If, like most computerists, you prefer to learn by experimenting, then you should go ahead and do so. I shall wait here until you need me.

* * * * *

The first thing you might try is to listen to one of to one of the songs programmed at the factory. Option 3 in the main menu will produce a numbered list on the screen of all the songs on the disk. You make your selection by entering a number (i.e., type it and then hit RETURN). This will get you back to the main menu. To play the music you must hit [f7] , which is the large grey key on the bottom-right of the keyboard.

Most of the songs are quite short, some have an accompaniment, and some do not. You may also notice that various different things appear on the screen while a song is playing.

When you have heard a few of them, it may occur to you that you could do better. This is almost certainly true! You should first, however, experiment with the SYNTHESIZER SETTINGS controls and the LYRIC EDITOR.

Get song number 5, "Home", from the disk and then press 4 on the main menu. This will produce a densely packed screen headed "SYNTHESIZER SETTINGS". The blue letters label the function, and the white ones represent the actual values, which you can change. The way to change something is to move the blinking cursor with the usual cursor keys, and then press either the [+] or the [-] .

CLICKER

First, press [f7] to hear the song. Now let's get rid of the clicker. Hold down the vertical cursor key until the 1Ø on the line near the bottom is blinking. This number represents the rate at which the metronome clicks are sounded. Hold down the [-] key and watch the number decrease. When it gets to Ø it will say 'OFF' and the clicks will be suppressed.

TEMPO

Next, touch the horizontal cursor key so that the cursor is over the 1 next to the word 'TEMPO'. Hit the [-] key twice. This will cause the setting to go to 15. Note that all of the numeric variables are scaled Ø to 15,

and that they "wrap around" if you go beyond the limit.

If you hear the song now, the meaning of 'Tempo" should now become clear, if you were not quite sure before.

DISPLAY

Return the tempo to its original setting, and move the cursor up one step to the 'DISPLAY' control. As you press the [+] key, the four display options should be named. This decides what will appear on the screen while the music is playing. (This, and all the other settings, are recorded on the disk along with the song.)

Try playing the song with each of the four options:

KEYS shows which keys are active. You will see that the [G] [H] [V] [B] and [RETURN] keys have functions. [RETURN] will abort the performance.

FACE is the animated drawing which mouths the words. There will be a delay the first time it is invoked as the face is brought from the disk.

WRDS shows the lyrics of the song, written in a special phonetic alphabet.

OFF allows you to see the setting screen, or whatever was showing when you hit the [f7] key.

GLISSANDO

Leave the display on KEYS, and move left to the GLISSANDO TIME control. This controls the time taken for the vocal pitch to glide between notes. Lower the setting to Ø and listen to the difference from when it is set at 9. Glissando can be selectively applied or removed by stabbing at the [G] or [H] keys while the music is playing. First, remove all glissando by holding down [H] while the song plays. Then play the song again, and tap [G] while the word "it" sounds. This will cause a glide on the first syllable of "ever". The point is, you must tell the program one note in advance when you

want to add glissando. You can remove it by hitting [H] while the glide is in progress; that is, on the 'e' of 'ever'.

VIBRATO

You will also see on the KEYS prompt that the [V] and [B] keys will add or remove vibrato. This is a regular wavering of the vocal pitch. It also can be applied to selected notes. There are no other controls for this.

One other control in the vocal section is an ON/OFF switch which simply suppresses the voice entirely. In order to better concentrate on the next section, which is the oscillators, leave the vocal switched OFF.

OSCILLATORS

Move the cursor up as far as possible, move left once, and turn off OSC3, then move left once more and turn off OSC1. (The three oscillators are labelled '1', '3', and '5' to correspond with the markings on the grey function keys which are associated with them.)

OSCILLATOR WAVEFORMS

If you now play the music, you should only hear the third oscillator, which is playing the bass part. If your TV or monitor does not have a large loudspeaker, it may be rather faint. This is because the triangle waveform has little energy in its upper overtones.

Let's make it sound louder. Take the cursor down to the word 'TRI' in the right-most column and hit [+] once. This will produce 'SAW' (short for 'sawtooth'), which is much more "buzzy" tone. Play the music to check it out, and then hit [+] once more to get the 'PLSE' waveform. This is also quite a raucous sound, but unlike the previous two, it can be varied by the next control down, the 'PULSE WIDTH'. A setting of Ø will make a very thin, reedy sound, something like a bassoon. Raising the value to 8 will give a much more mellow tone, closer to a clarinet. This is, in fact, a square wave.

PULSE WIDTH MODULATION

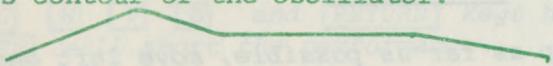
If the pulse width is set to 15, then it will be automatically swept over its range to produce a rich 'phasing' type of sound that sounds best on long notes.

One further touch of the [+] key will give you NOISE. This can make sounds ranging from snare drums to hand claps if the envelope shaper is set right.

Leave the waveform on PLSE and move up four clicks to 'ATTACK TIME'.

THE ENVELOPE SHAPER

The ATTACK TIME, DECAY TIME, SUSTAIN LEVEL and RELEASE TIME are the four phases of the envelope. This is the loudness contour of the oscillator:



attack decay sustain release

The sound builds up to a fixed level during the ATTACK TIME, and then DECAYS to the SUSTAIN LEVEL. At the end of the note it dies away to nothing in the RELEASE TIME.

First, listen to the music with the attack time on 15. The whole sound will be much softer. This is because each note never has time to reach its full volume before it is ended.

Now return the attack to Ø and set the sustain to Ø. This makes quite a plunky sound whose character is controlled mostly by the decay time.

If the attack and decay times are not very long, less that about 1Ø, then the apparent loudness of a note can be controlled by the sustain level. The sustain level itself can be modulated by the addition of accents. Set the sustain level to 7 and press [f5]. This will put you in a mode that allows you to use the [A] and [S] keys to modify the sustain level of a note. If the value in the settings screen is 1 to 7, then it will be doubled for any note that sounds while the [A] key is pressed.

If it is between 8 and 15, then its value will be reduced according to this table:

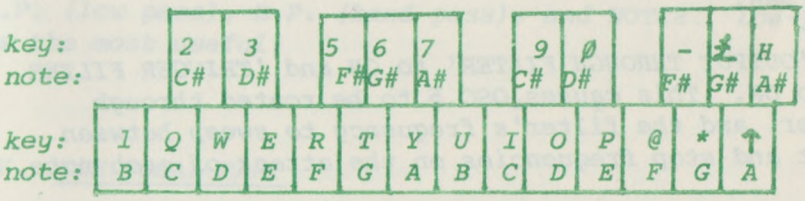
unaccented--	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
accented --	0	2	4	6	8	10	12	14	0	2	4	6	8	10	12	14

* * * * *

III. RECORDING A TUNE

If you have faithfully followed the instructions this far, you may be wondering how you can record your own tune. Here's how:

With the SYNTHESIZER SETTING screen showing, simultaneously press [SHIFT] and [f5] . A prompt should appear titled 'RECORDING OSC.5 TUNE'. Below that should be two lines which represent certain of the top two rows of keys. See that those of the top row are grouped in twos and threes. They correspond to the black notes on a piano. For example, the [2] represents C#. and the [3] is D#. The second row ([Q] [W] [E] [R] [T] [Y] etc.) represents the white notes.



It is helpful to stick small paper labels on the front of the active keys in the upper row.

Now type in a few notes. The sound should come out as you play. To end the recording, hit [RETURN] . You can replay what you have just recorded by hitting the [f5] key. If there was a long gap before you palyed the first note, this will also be reproduced.

Now you will learn of a special feature which lets you re-time notes which have previously been recorded. You do this by re-entering the record mode ([SHIFT] [f5]), and using any of the keys except those assigned a par-

ticular pitch. Use [M] and [N]. As you play them you will hear the notes you recorded before, but with the timing and duration you are playing now. All this is of course being recorded. While you are recording, you may at any time use the [DELETE] key to step backwards through the sequence. You can then change a wrong note. You cannot, however, remove a note or add an extra one without re-recording all the subsequent ones.

You may have also noticed in the KEYS display that the [CTRL], [C=] (Commodore) and [SHIFT] keys are labelled in octaves. If you hold them down while playing the pitch keys, the whole range of pitches will be transposed. You may hold the [C=] key and the [CTRL] key together to get the deepest notes.

* * * * *

IV. THE FILTER

At this point you should have a little tune recorded on OSC.5. The other voices should be silent. Set OSC.5 controls as follows: attack Ø, decay 3, sustain 7, release 3, SAW.

Now set 'OUTPUT THROUGH FILTER' to ON and 'TRIGGER FILTER SWEEP' to ON. This causes OSC.5 to be routed through the filter, and the filter's frequency to sweep between the start and stop frequencies on the attack of each note.

The filter is a device which emphasizes or attenuates certain audio frequencies. Its effect is most audible when the sound entering it contains many overtones, as do all of the oscillator's waveforms except TRI.

If you play the music, the line you recorded should have a trumpet-like quality. This is because the filter, being set to L.P. (low-pass), and sweeping upwards, only allows the upper partials to sound some time after the note's attack. This is a characteristic of many brass instruments.

At this point you may be perplexed to hear that the volume of sound is very low. This may be so if your particular

computer has a filter whose overall frequency range is low. The fix is to add two or three to the values of the filter start and stop frequencies. If, on the other hand, the sound is quite bright and the filter does not seem to be having much effect, then you should subtract a couple of points. You will of course have to make similar changes to the other songs where an oscillator is routed through the filter.

You can now experiment with the other filter controls. The sweep time has the most noticeable effect. The resonance control, as it is raised, amplifies frequencies in an ever narrower band.

Try swapping the values of the start and stop frequencies. This will cause the filter's frequency to fall instead of rise. This, combined with a low value of resonance, reproduces a quality of most plucked instruments, where the upper partials die away faster than the fundamental.

The third line of the filter controls decides the overall shape of the filter. The options are H.P. (high pass), L.P. (low pass), B.P. (band pass), and NOTCH. Low-pass is the most useful.

* * * * *

V. THE VOCAL PART

We will now go through the procedure for writing a song from scratch.

* *Press* [M] *to get back to the MAIN MENU.*
* *Press* [3] *to see the list of songs on the disk.*
* *Enter 5 to load the song "Home". (Actually, we will only be using the synthesizer settings of "Home".)*
* *Press* [2] *to clear the song memory.*
* *Press* [5] *to edit the words.*

At this point you should see a screen titled LYRIC EDITOR. This allows you to type in the words of a song in the phonetic alphabet. You are allowed nine lines of words, each with up to 77 characters. All words to be entered into the song must be typed on a numbered line. This means that you must move the cursor down from its initial position next to the '?'. If you type characters on this top line, they will be instantly spoken with a flat intonation, but will not be included in the song. This is intended as an aid in choosing the right spelling.

Move the cursor down to the line numbered 1 and enter the following:

0/0/ SAAY/KAEN/YU/SE/. (The slashes mark the end of each note.)

After you hit [RETURN], the cursor should reappear next to the '?', blinking at a faster rate. You can now press [SHIFT] and [f7]. (The shift key here is like the red record button on most cassette players.)

The machine is now waiting for you to play in the melody. Press these keys:

[T] [E] [Q] [E] [T] [I] [RETURN]

You should hear the words come out with their proper pitches. As with the oscillators earlier, you can record again and use the [M] and [N] keys to re-time the notes without changing their pitch.

EDITING THE WORDS

If a line is to be repeated you can save yourself the trouble of typing it again by moving the cursor down and changing the line number. If you erase the line number, it will be spoken as if it had been typed on the top line.

Be sure to hit [RETURN] before leaving a line, or else the changes you made will not be entered in the memory.

If you replay the little example and listen carefully, you may think that it would sound better if the 'A' in

'can' were lengthened at the expense of the 'N'. You would do this by adding extra 'AE' phonemes in the middle: /KAEAEAEN/. If you don't do this, then the last phoneme in a note, before the next slash, will sound until the end of a note. If this last phoneme is a stop conconant, (B, D, G, K, P, T, DT), then there will be a silence after it has sounded.

PHONETIC SPELLING

All words must be written in phonetic spelling. There is a phoneme alphabet detailed in Appendix III which shows the one, two or three letter code for each phoneme.

The consonants are pretty much the same as in ordinary English. There are some fourteen distinct vowel sounds, most of which come in two or three lengths, giving a total of thirty-six vowel phonemes. The 'U' sound as in 'cup', for example, is written as 'UH'. The same sound is used in the first syllable of 'about', but it is much shorter. In this case the phoneme 'UH2' would be used: UH2BAH1WT.

The vowel phonemes are continuous, unchanging sounds. Many vowels in English are actually dipthongs, that is, they glide from one pure vowel to another. To make such sounds, one must string together two or more phonemes.

Here are some dipthongs and the phonemes that sound OK in singing:

A-AY	*sAme*
AH1-Y	*EYE*
AH1-W	*abOUt*
O-W	*Oh*
O-Y	*tOY*
Y-U	*YOU*

VI. RE-DRAWING THE FACE

Option 7 on the MAIN MENU lets you use a simple graphics program with which you can draw anything the computer is capable of showing in the high-resolution, multi-color graphics mode.

The screen is composed of 32,000 dots, and each may have one of four colors. Drawing a detailed picture, therefore, requires some patience.

When you enter the drawing program, the usual face should appear with a small blinking dot near the top left of the mouth area. This marks the corner of a rectangle which contains the moving part of the mouth. If you touch the keys numbered [Ø] to [7] you will see the mouth change shape. Each of these shapes may be modified separately. There is also a rectangular area above the eyes which can have one of eight different forms.

The method of drawing is to press one of the four keys: [Z] [X] [C] [V] . Each of these will deposit a particular color under the blinking cursor. If you simultaneously hold the [SHIFT] key, the cursor will be moved right one place after the color is marked. The cursor may be moved without drawing anything with the usual cursor keys.

The colors assigned to the four keys vary in different parts of the screen. For the fleshy part of the face it is as follows:

[Z]	white
[X]	yellow
[C]	orange
[V]	brown

You can change the color assigned to each of the four keys by simultaneously pressing that key and the [C=] key. This will select the next color on the list of sixteen: black, white, red, cyan, purple, green, blue, yellow, orange, brown, lt red, dark grey, med. grey, lt green, lt blue, lt grey.

Changes to the [Z] key color apply to wherever that color is, all over the screen, Changes to the color of the other keys only apply to a small rectangle in the vicinity of the cursor. These rectangles are the usual character cells - a matrix of 40 X 25 over the whole screen. Each is four dots wide by eight dots high.

You can leave the face drawer by hitting [RETURN]. *Before you get back to the MAIN MENU you will be asked if you want to save your new face on the disk. If you respond with* [Y], *then the previous face will be overwritten, unless you put another disk in the drive.*

* * * * *

APPENDIX I

FILES ON MUSIC, 15 DISK

MUSIC	The main program, written in BASIC, that lets you write and play songs. It loads and executes various machine code programs which it gets from the disk.
SING 36-M	This file contains the machine code that actually makes the music.
FACE 1	This is the high resolution face that can appear on the screen when the VOICE BOX is singing.
INSTRUCTIONS	A text file with brief instructions that are printed on the screen when a suitable command is given in the MUSIC program.
CFDR-6	Machine code used when you make changes to the face.
T-WABASH	The tune part of the song, "Wabash Canonball"
W-WABASH	The lyrics of "Wabash Canonball", written in the phonetic alphabet.

All other songs similarly appear as two files on the disk.

APPENDIX II
KEYS YOU MAY USE
IN DIFFERENT PARTS OF THE PROGRAM

MAIN MENU :

Use keys [1] to [7] to select one of the options.

[f1] record OSC.1 accents
[f3] record OSC.3 accents
[f5] record OSC.5 accents
[f7] record vocal glissando and vibrato
[SHIFT] and [f1] record OSC.1 tune
[SHIFT] and [f3] record OSC.3 tune
[SHIFT] and [f5] record OSC.5 tune
[SHIFT] and [f7] record vocal tune

Here and elsewhere you can simply press [f7] to hear the music.

VIEWING INSTRUCTIONS :

[RETURN] to see further instructions, [M] to get back to MAIN MENU. Function keys may also be used to play the music.

GETTING A SONG FROM DISK :

The program will only accept a number corresponding to one of the songs listed on the screen, followed by [RETURN]. Anything else will return to the MAIN MENU without loading a song.

MAKING A MEDLEY:

You should enter a single line of numbers, separated by asterisks to hear the songs they represent in order. For example, 1*1Ø*2Ø [RETURN] .

SYNTHESIZER SETTINGS :

The usual cursor control keys and the [+] and [-] keys should be used to change values.

Use one of the function keys to play the song, together with [SHIFT] key to record.

[M] returns to the MAIN MENU.

LYRIC EDITOR:

All unshifted alphabetic keys can be used for writing words.

Function keys may be used to play or record.

Get back to MAIN MENU by hitting [RETURN] or [M] [RETURN] on empty first line.

SAVE SONG:

Enter number to replace one of the songs on disk, or type new name. [RETURN] with nothing else will get back to MAIN MENU without writing on disk.

RE-DRAW FACE:

When face drawer instructions are displayed, the program waits for you to press any key before entering the actual program. When you have done so, the active keys are:

[Z] [X] [C] [V] -- deposit color under cursor
[SHIFT] and [Z] [X] [C] [V] -- deposit color and move cursor
SPACE BAR has same effect as [SHIFT] [Z] .
[C=] and [Z] [X] [C] [V] --change color assigned to key
Cursor Keys -- move cursor
[RETURN] -- leave Face Drawer

WHEN RECORDING OSC.1, 3, 5 TUNE:

Top two rows of keys enter musical pitches.
[SHIFT] - up two octaves, [CTRL] - down one octave, [C=] - down two octaves.
All other keys re-time previously entered notes.

WHEN RECORDING OSC.1, 3, 5 ACCENTS:

[A] - add accent (double sustain level)
[S] - remove accent
[V] - add vibrato
[B] - remove vibrato

WHEN RECORDING VOCAL TUNE:

Top two rows enter musical pitches (see chart on page 8)
[SHIFT] adds vibrato. [CTRL] adds glissando.

WHEN RECORDING VOCAL EXPRESSION:

[G] - add glissando, [H] - remove glissando
[V] - add vibrato, [B] - remove vibrato

WHENEVER MUSIC IS PLAYING:

It may be stopped by hitting [RETURN.]

APPENDIX III
PHONEME LIST

EXAMPLE	PHONEME				
	long -	-	-	-	-short
no sound	.				
dAy	A	A1	A2		
dAd	AE	AE1			
fAther	AH	AH1	AH2		
cAll	AW	AW1	AW2		
Bag	B				
CHip	TCH				
paiD	D				
buTTer	DT				
bE	E	E1			
gEt	EH	EH1	EH2	EH3	
bIRd	ER	R			
Fast	F				
Get	G				
Hello	H				
pIn	I	I1	I2	I3	
yoU	IU				
Judge	DJ				
triCK	K or C				
Land	L				
Mat	M				
suN	N				
thiNG	NG				
mOre	O	O1	O2		
bOOk	OO	OO1			
Past	P				
Red	R				
paSS	S				
SHop	SH				
Tap	T				
THin	TH				
THe	THV				
mOve	U	U1			
cUp	UH	UH1	UH2	UH3	
Van	V				
Win	W				
anY	Y				
Zoo	Z				
aZure	ZH				

Addendum

Addendum

The VOICE BOX Music System for Commodore 64 will work regardless of whether or not you have a VOICE BOX Speech Synthesizer. However, you will not be able to hear the vocal parts of the music unless you are also using a VOICE BOX.

They are available at your favorite Commodore computer store, or direct from The ALIEN Froup. Write us for details on how to order, and for complete descriptive information on all of our other products for home computers.

The ALIEN Group will repair any product which fails operate properly due to defects in materials or workmanship for a period of thirty (30) days from the date of purchase, assuming that said product has not been abused or modified. In the event that it should ever become necessary to return your unit to the factory for service, please ship it to us, securely packed, postage prepaid and insured, along with your check or money order for $ 5.00 to cover the cost of handling and return shipping. All other charges for parts and labor will be paid for by the ALIEN Group during the period of this warranty.

To qualify, please fill out & return the enclosed Warranty Registration Form within ten (10) days of purchase.

This Warranty gives you specific legal rights. You may also have others which vary from state to state.